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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROGER A. GREY and EDRICK MORALES

Appeal 2009-009151
Application 10/770,924
Technology Center 1600

Decided: December 22, 2009

Before TONI R. SCHEINER, FRANCISCO C. PRATS, and
STEPHEN WALSH, *Administrative Patent Judges*.

WALSH, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) involving claims to a process for producing an epoxide. The Patent Examiner rejected the claims for obviousness. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

“The invention relates to an epoxidation process using a mixed catalyst system to produce oxides from hydrogen, oxygen, and olefins.” (Spec. 1:6-7.) “The mixed catalyst system comprises a palladium-containing titanium zeolite and a palladium-free titanium zeolite.” (*Id.* at 1:7-9.)

Claims 1-18, which are all the pending claims, are on appeal. Claim 1 is representative and reads as follows:

1. A process for producing an epoxide comprising reacting an olefin, hydrogen and oxygen in the presence of a catalyst mixture comprising a palladium-containing titanium zeolite and a palladium-free titanium zeolite.

The Examiner rejected the claims as follows:

- claims 1-18 under 35 U.S.C. § 103(a) as unpatentable over Jones¹ and Sato;² and
- claims 1-18 under 35 U.S.C. § 103(a) as unpatentable over Grey³ and Bowman.⁴

Claims 2-18 have not been argued separately and therefore stand or fall with claim 1. 37 C.F.R. § 41.37(c)(1)(vii).

¹ C. Andrew Jones, *Direct Epoxidation Process Using A Mixed Catalyst System*, US Patent No. 6,307,073 B1, Oct. 23, 2001.

² Akira Sato et al., *A Method for Manufacturing Propylene Oxide*, JP Application (Kokai) No. 4-352771, Dec. 7, 1992.

³ Roger A. Grey et al., *Direct Epoxidation Process Using A Mixed Catalyst System*, US Patent No. 6,498,259 B1, Dec. 24, 2002.

⁴ Robert G. Bowman et al., *Process For The Direct Oxidation Of Olefins To Olefin Oxides*, Int'l Pub. No. WO 98/00413, Jan. 8, 1998.

OBVIOUSNESS

The Issues

The Examiner and Appellants agree that Jones and Bowman each taught an epoxidation process that used a palladium-free titanium zeolite catalyst, and that Sato and Grey each taught an epoxidation process that used a palladium-containing titanium zeolite catalyst. *Compare* the facts set out in the Non-final Rejection dated Oct. 19, 2005, and in the Appeal Brief.

The Jones and Sato rejection and the Grey and Bowman rejection thus raise the same issues.

The Examiner's position is that "[b]oth palladium-free titanium zeolite and palladium-containing titanium zeolite catalysts [were] known in the [epoxidation] art." (Non-final Rej. dated Oct. 19, 2005, at 2.) The Examiner concluded it would have been obvious to run an epoxidation process using both the Jones palladium-free titanium zeolite and the Sato palladium-containing zeolite, or both the Grey palladium-containing zeolite and the Bowman palladium-free zeolite, "in order to obtain their cumulative effects." (Rej. at 2.)

Appellants contend that the "cited patents neither suggest Appellants' claimed invention, nor would give one of ordinary skill a reasonable expectation that the claimed process would be successful." (App. Br. 4.) According to Appellants, "one of ordinary skill would not be motivated to combine a palladium-containing titanium zeolite with a palladium-free titanium zeolite because the palladium-containing zeolite (by itself) is known to be a catalyst useful for olefin epoxidation with hydrogen and oxygen." (Id. at 6-7.) Appellants also contend that the use of a palladium-containing catalyst and a palladium-free catalyst "surprisingly results in

enhanced productivity per amount of palladium.” (*Id.* at 7, *citing* Spec. Examples 3 and 4, said to show 17-36% higher palladium productivity.)

The issues with respect to this rejection are:

Have Appellants shown the Examiner erred in finding a motivation to combine the two different catalysts;

have Appellants shown that the Examiner’s proposed combination lacked a reasonable expectation of success; and

have Appellants established a surprising or unexpected result?

Findings of Fact

The relevant factual content of the references is not in dispute. We adopt the Examiner’s findings.

Principles of Law

A rejection for obviousness must include “articulated reasoning with some rational underpinning to support the legal conclusion.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007), quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 550 U.S. at 416.

“It is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose.” *In re Kerkhoven*, 626 F.2d 846, 850 (CCPA 1980).

“Obviousness does not require absolute predictability of success. . . . [A]ll that is required is a reasonable expectation of success.” *In re O'Farrell*, 853 F.2d 894, 903-04 (Fed. Cir. 1988).

Analysis

The Examiner reasoned that “[t]he idea of combining somewhat different but otherwise analogous catalysts flows logically from their having been individually taught in related processes producing the same epoxide products in prior art.” (Rej. at 2, citing *In re Kerkhoven*.) We agree that the Examiner set out a legally sufficient prima facie case of obviousness. See *Kerkhoven*, 626 F.2d at 850. Moreover, the Examiner found that obtaining the cumulative effects of the two kinds of catalyst would have been desirable. Although Appellants dispute that there would have been a motivation to use both kinds of catalyst together, they have not shown the Examiner erred in finding one of ordinary skill in the art would have expected cumulative effects. Thus, the prima facie case was founded not only on the *Kerkhoven* principle, but also on additional evidence of the desirability of the combination.

Appellants argue that their combined catalyst has a surprising result: enhanced palladium productivity. (App. Br. 7.) The Specification discloses that when a palladium-containing titanium zeolite catalyst and a palladium-free titanium zeolite catalyst are used together, the productivity is greater than with the palladium catalyst alone. (Spec. at 10:4-6.) The Specification expresses the increase in terms of “palladium productivity,” apparently attributing all the catalytic effect to palladium, and none to the palladium-free titanium zeolite. We find this explanation unsatisfactory. It is

undisputed that palladium-free titanium zeolite was known to catalyze epoxidation. Rather than evidence of a change in “palladium productivity,” we find the increased productivity may be only the cumulative effect of the two kinds of catalyst that would have been predicted. “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 550 U.S. at 416.

Finally, although Appellants argue that the Examiner’s proposed combination lacked a reasonable expectation of success, they provide no explanation how that could be so. Appellants provide no evidence that a person of skill in the art would have expected any difficulty associated with running an epoxidation process using the Jones and Sato, or Bowman and Grey, catalysts respectively, in a mixture.

CONCLUSIONS OF LAW

Appellants not shown the Examiner erred in finding a motivation to combine the two different catalysts;

Appellants have not shown that the Examiner’s proposed combination lacked a reasonable expectation of success; and

Appellants have not established a surprising or unexpected result.

SUMMARY

We affirm the rejection of claims 1-18 under 35 U.S.C. § 103(a) as unpatentable over Jones and Sato; and

we affirm the rejection of claims 1-18 under 35 U.S.C. § 103(a) as unpatentable over Grey and Bowman.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

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